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THE CROP REPORTING SYSTEM

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On or about the eighth of each month a report is issued by the Bureau of Statistics of the United States Department of Agriculture concerning the state of crops on the first of the month. The important influence which the size of crop production exerts, not only upon the markets for specific products considered but upon general business activity, gives a peculiar interest and value to these reports; inasmuch as they furnish the most comprehensive and adequate indications of probable future supplies, several months before harvests and the movement of crops.

Of the many products of the farm, the four, namely, wheat, corn, oats, and cotton are generally known as "speculative" crops, because there are well established markets for trading in future deliveries of these products. Owing to the influence of Government crop reports upon prices and the ease of speculating in these four products, special precautions are observed in the preparation and issuance of such reports to prevent any person securing an undue advantage therefrom.

The offices of the Bureau of Statistics, where the crop reports are prepared, are located on the second floor of the main building of the Department of Agriculture, situated in the beautiful, quiet park, or mall, between the capitol and the Washington monument. Here a Crop Reporting Board, consisting of the Chief of the Bureau and four assistants, prepares the crop report, or such part of the report as relates to the "speculative" crops. During the session of the board no communication is allowed between the bureau and the outside, except through the Secretary of Agriculture. All doors are locked and doorkeepers are stationed to prevent persons entering or leaving. Even the telephones to the bureau are disconnected.

Shortly before the time previously announced for the issuance of the report, fifteen or twenty newspaper representatives, or others interested in the report, gather about the corridors, ready

to receive the report as soon as issued. About a minute before the time set, the Secretary of Agriculture and the Chief of Bureau appear, the chief with about twenty-five typewritten copies of the report. These are spread out upon a long table, printed side downward, and folded copies handed to operators of the Western Union and Postal Telegraph companies, which have branch stations at the entrance of the Bureau. Each newspaper man places his hand upon one copy, ready to grab and run at the word "Go," which is called by the Chief of Bureau at the instant announced for the issuance of the report. Within less than five seconds every reporter has disappeared from the corridor, every available telephone is being used to transmit the report, and the telegraph companies are sending it broadcast. Within fifteen or twenty seconds the report is being read in New York, Chicago, and other market centers, perhaps causing much excitement and readjustment of prices, a striking contrast to the calm and serenity which surrounded the preparation of the report.

Government crop reports, even such portions as relate to acreages and yields, are not the result of actual farm-to-farm canvass or enumeration, but are the results of a combination of a large number of estimates, or personal judgments of conditions, each estimate covering a more or less indefinite area, systematically collected, compiled and averaged.

An important consideration concerning the value of crop reports is their timeliness; that is, their object is to furnish reasonably accurate information concerning crops before they have been completely marketed or consumed. A complete census is vastly more costly and requires so much time that the results are not known until the crop has passed into history. Many tests have proven that for comparative purposes crop reports so collected are almost as accurate as a census.

The first appropriation for collecting agricultural statistics by the Department of Agriculture was provided for by the act of February 25, 1863, which was made in bulk for the work of the department, amounting in all to \$90,000. The then Commissioner of Agriculture allotted a part of this amount for collecting agricultural statistics, and appointed a statistician for that purpose. For the fiscal year ended June 30, 1865, the first distinct and separate provision was made for collecting agricultural statistics

for information and reports, and the amount of \$20,000 was appropriated. From an allotment of a few thousand dollars each year at first, the crop-reporting service has been evolved and enlarged into the Bureau of Statistics of the Department of Agriculture, with an annual appropriation of about \$225,000.

The three principal inquiries made by the Crop Reporting Service, concerning each important crop are, first, the area planted, made immediately after the planting season; second, the condition of the crop, made monthly during the growing period; and, third, the yield per acre, made at harvest time. The total production is readily obtained by multiplying the estimated yield per acre by the estimated acreage.

Several other, but minor, inquiries are made at proper times in the year; these include quality, prices, stocks on hand, and amount shipped from counties of production.

The acreage of a crop is obtained by applying to the acreage of the preceding year an estimated percentage of increase or decrease. The form in which the question is asked of the correspondents and agents of the bureau, whose answers form the basis of the bureau's estimates, is as follows: "Acreage—What is the acreage planted this year [in the territory covered by correspondent or agent] compared with last year, in per cent; in representing acreage in comparison with last year, 100 is to represent the acreage last year." If the acreage last year in any state were 1,300,000 and the acreage this year were estimated at 110 per cent of last year's acreage, 1,430,000 would be the estimated acreage for this year. Last year's acreage was obtained by applying a percentage to the acreage figures of the preceding year, and so on from year to year. A new base, or revision, is made every ten years, from the census. The Bureau of the Census of the Department of Commerce and Labor, last year took a census of the crops grown in 1909, which included their acreages. The results for all states have not yet been completed; but when complete they will be used by the Bureau of Statistics as the acreage for 1909. The bureau will then revise its estimate of 1910 by applying to the census figures of 1909 the estimated percentage which the 1910 crop was of the 1909 crop; and similarly will apply to the revised estimate of acreage in 1910 the estimated percentage which the 1911 crop was of the 1910 crop, to obtain a revised estimate of acreages in 1911. The acreage in 1912 will be

obtained by applying a percentage to the 1911 figures, and so on from year to year, until a revision can be made, based upon a new census.

It may be observed that if an error is made in the estimated change of acreage from any one year to another, it is continued from year to year, until the next revision; that is, the method of obtaining the acreage of crops is subject to "cumulative errors." In the past a revision has been made, based upon a census, every ten years. Provision has been made for a census of agriculture every five years in the future, instead of ten. Such frequent revision will prevent any wide departure arising from "cumulative errors." A comparison of the acreage of wheat, corn, and oats, as estimated by the Bureau of Statistics in 1909 and as returned to the census, in the states in which the census is practically complete, comprising more than one-half the total area in the United States, indicates that the estimate of the Bureau of Statistics of corn acreage in 1909 was excessive by 2.6 per cent, the wheat acreage excessive by 4.0 per cent, and the oats acreage deficient by 5.4 per cent.

The conditions of crops are reported in the form of a percentage, the base, or one hundred, being called a "normal." The form in which the question is asked of correspondents and agents of the bureau is: "Condition—normal growth and vitality giving promise of a full crop being represented by 100—per cent?"

A normal condition may be defined as a condition that will produce a normal yield, if such condition is maintained until harvest. But what is a normal yield?

Most farmers know from experience approximately what their fields ought to produce, with the usual mode of farming, with normal weather conditions, and without unusual loss from disease, insects, or other injurious influences. A yield under such favorable, though not extraordinary conditions, would be a normal yield, which is more than an average yield but less than a maximum possible yield. A condition which may produce a normal yield, as thus described, is a normal, or one hundred per cent condition.

A normal yield for one farm or section may vary widely from that for another. On one field a normal yield per acre of corn might be eighty bushels, and on another field twelve bushels. A normal yield of corn for one state is more than forty bushels per acre, for another state it is less than fourteen bushels.

The condition of a crop at a given date is expressed by the percentage of a normal yield which may be produced if no change in the condition or status of the crop occur from the given date to the time of harvest. For example, if the condition of the wheat crop on June 1 were such that, with no change in condition—that is, normal influences from that date to harvest—only three-fourths of a normal yield could be expected, the condition would be reported as seventy-five per cent; if only one-half a normal crop could be expected, the condition would be reported as fifty per cent; if ten per cent more than a normal yield could be expected, the condition would be reported as 110.

The purpose of crop condition reports is to estimate probable future supplies under prevailing growing crop conditions. It is assumed that average conditions at any time are indicative of average yields per acre; that conditions above an average at any time are indicative of yields above the average; and conditions below the average at any time are indicative of yields below the average. If at any time the condition of a growing crop is five per cent above the average condition for such time, it is assumed that the yield is more likely to be five per cent above the average yield than any other amount. If the condition at any time is ten per cent below the average for such time, it is assumed that the yield is more likely to be ten per cent below the average than any other amount.

The process in the interpretation of condition figures may be explained by an example. The condition of corn on July 1, 1911, was 80.1 per cent of a normal condition; in the last five years the condition has averaged eighty-five per cent of a normal condition; thus the condition on July 1 is 5.8 per cent below the average condition (80.1 being 94.2 per cent of 85), and suggests a yield of 5.8 per cent below the average. In the last five years the yield averaged about 27.1 bushels; 94.2 per cent of 27.1 bushels (94.2×27.1) is about 25.5 bushels; therefore conditions are said to indicate a yield of 25.5 bushels. That is, if the condition of the corn crop be 5.8 per cent below the average at harvest time, a yield of 25.5 bushels is the most reasonable expectation; if less than the average adversity befall the crop before harvest, a larger yield may be expected; if more than the average adversity befall the crop, a yield less than 25.5 bushels may be expected.

The yield per acre is obtained by simply asking the agents and

correspondents to estimate the average yield per acre in bushels of grain, pounds of cotton, etc., in the section of the country covered by the agent or correspondent.

The principal sources of information upon which the crop reports are based are reports of agents and voluntary correspondents scattered throughout the United States. The crop data are collected in quadruplicate; the state is regarded as the unit in the compilation of the reports. The Statistician (and the Crop Reporting Board, for wheat, corn, oats and cotton), therefore, is provided with four averages for each item and each state, each average being the result of the compilation of all the returns of the several sources of information. These four sources are as follows:

First, township correspondents, second, county correspondents, third, state statistical agents, and fourth, special field agents.

Township correspondents are persons who, upon request, voluntarily answer questions concerning crops, on printed schedules, mailed to them monthly by the Bureau of Statistics. There are about 32,000 in the United States. In the more important agricultural sections the average distance between correspondents is five to eight miles. Each correspondent reports upon the state of crops in his vicinity as he sees them. The reports of all the township correspondents of a state are combined to obtain an average for the state; that is, a straight average is taken of all returns from a state.

The county correspondents, like township correspondents, are voluntary reporters, but report for their entire county instead of their immediate vicinity. Each county correspondent is supplied with stationery and government franked envelopes to make personal inquiries throughout his county, so as to enable him to make a report for the whole county. There are about 2,800 agricultural counties in the United States. In obtaining the average for the state from the reports of county correspondents, each county report is weighted according to its relative importance of the county in the production of the crop reported upon. If one county has approximately 20,000 acres of corn and another county but 1,000 acres, the one is given a weight of twenty and the other one, when corn is reported upon. That is, a weighted average is taken of the returns of county correspondents to obtain the average for the state. The reports of township correspondents and of county correspondents are mailed direct to Washington.

State statistical agents are persons who devote a portion of their time, at a small salary, varying according to the importance of the state from \$300 to \$1,100 per annum, to reporting for the state as a whole the same information as is asked of township and county correspondents. Each state statistical agent maintains a corps of voluntary correspondents, from which to collect this information, the number of such correspondents in all the states being about 15,000. State agents are provided with schedules and stationery for this purpose. The state agents in the larger states have their state divided into about nine sections; a straight average is made of all the reports received from a section, to obtain the average for the section; and a weighted average is obtained for the state by giving to each section average a weight proportionate to its relative importance in the state.

The fourth regular source of information is reports from the special field agents. The entire United States is divided into about fifteen districts, comprising about three states in each district. A traveling field agent is assigned to each district. He devotes his entire time to inspection and investigation of crop conditions; he travels systematically throughout his territory, viewing crops, interviewing various parties able to impart information concerning crops; and he reports for each state as a whole, with notes and comments, data concerning crops similar to those given by other classes of correspondents.

In addition to these four regular sources of information, the Bureau of Statistics maintains several special lists which are used occasionally for special inquiries; for instance, when information concerning the yield per acre of wheat is desired, schedules asking for this information are sent to a special list of mills and elevators; when the yield per acre of cotton is desired, schedules of inquiries are sent not only to the four regular classes enumerated, but to every ginner, of which there are about 30,000, to a special list of cotton growers, asking for the yield per acre on their individual farms, and also to a list composed of merchants, bankers, cotton factors, and others in the cotton section interested in the cotton crop. The total number on all lists is about 150,000.

It is impossible with the means at hand to estimate annual production of every product grown. The Bureau therefore confines its efforts in estimating acreages and yields to twelve of the most

important crops, wheat, corn, oats, cotton, hay, potatoes, barley, rye, flax, rice, buckwheat, and tobacco. These, however comprise about ninety-five per cent of the acreage and eighty per cent of the value of all crops. Many minor crops such as beans, peanuts, onions, cabbages, etc., for which estimates of actual production are not given, are nevertheless reported upon as to condition of growth and as to percentage of a full crop produced.

After the reports of township correspondents and county correspondents relating to important crops have been tabulated upon large sheets, but before they have been added and averaged, each sheet of an important state is cut into two parts in such a way that no name of county, state or other mark to indicate the state to which it belongs is left upon the part containing the figures, except that both parts are given a like number by the Chief of Division, and the portion with the names of counties and state kept in a locked drawer. This precaution is to prevent any clerk from obtaining advance knowledge concerning the results for any state.

The reports from special field agents and state statistical agents are mailed in special envelopes or telegraphed in cipher, to the secretary, who keeps them in a securely locked box until the morning of the report. When the board has assembled, the reports regarding the speculative crops from state and field agents are delivered by the secretary, opened and tabulated. The figures by states, from the several classes of correspondents and agents are placed in convenient parallel columns, a separate sheet being used for each separate crop or question. (See Exhibit A.) The board is thus provided with several estimates for each state and each crop, made independently by the respective classes of correspondents and agents of the bureau. Notes and comments of agents and weather reports are read. With all these data before the board, each individual member computes independently, on a separate sheet, or final computation slip, his own estimate of the acreage, condition, yield, or whatever subject is being considered. The results obtained by each member are brought together and compared, state by state, and discussed by the board under the supervision of the chairman and the final figures for each state decided upon. (See Exhibit B.)

The estimates by states, as finally determined by the board, are weighted by figures proportionate to their relative importance, the results being a true weighted average for the United States for

each subject. Other crops than wheat, corn, oats, and cotton are prepared in the same way except that the entire board does not review them.

As quickly as the board determines upon the final figures by states and the averages for the United States have been obtained by expert computers, a summary is set up on a duplicating machine, and copies of the summary are given to the public at the appropriate time in the manner already described. About two thousand copies of the summary are mailed at the same time to newspapers, and various organized bodies interested in the reports and soon thereafter the details of the report are published in the "Crop Reporter," which is mailed gratis to any person requesting it. An edition of 170,000 copies is published monthly.

As the object of crop condition reports is to throw some light upon the question of probable future supplies, it may be of interest to note what relation exists between estimates of condition and the ultimate yield as finally estimated. This is shown graphically in a chart (Exhibit C) which gives the condition of the corn crop on October 1, yearly, from 1890 to 1909, inclusive, and the yield per acre yearly, during the same period, as finally estimated. It will be observed that there is a reasonably close approximation.

Crop reports have a steadying effect upon markets by discrediting false reports which would otherwise circulate widely and adversely affect market conditions. By increasing knowledge of supplies and lessening the risks, the cost of distribution of a crop is reduced. If the crop reports of the Government be the means of lessening the margin between the price paid by consumers and the price received by producers by one-eighth cent per bushel for wheat, corn, and oats and but one-twentieth cent per pound for cotton, and this is a conservative estimate, the saving to producers and consumers on these crops alone is approximately \$5,000,000 annually.

EXHIBIT A.—Condition of Corn.

[Sample Sheet]

States and Territories	Field	State	County	Township	Board Members' Estimate
Maine		95	95	89	94
New Hampshire		89	93	87	89
Vermont		85	84	86	85
Massachusetts		88	90	88	88
Rhode Island		97	101	90	97
Connecticut		90	95	89	90
New York		82	83	80	82
New Jersey .....	.78	79	80	76	78
Pennsylvania .....	.79	81	76	77	78
Delaware .....	.83	82	92	83	83
Maryland .....	.74	78	74	75	75
Virginia .....	.83	80	83	81	81
West Virginia .....	.63	62	74	69	65
North Carolina .....	.83	83	82	83	83
South Carolina .....	.88	85	85	84	85
Georgia .....	.84	86	86	83	84
Florida .....	.83		85	86	84
Ohio .....	.78	78	76	75	77
Indiana .....	.87	86	87	85	86
Illinois .....	.87	87	86	85	86
Michigan .....	.75	77	76	79	77
Wisconsin .....	.72	75	79	77	76
Minnesota .....	.79	81	80	76	80
Iowa .....	.82	82	83	82	82
Missouri .....	.82	84	83	85	84
North Dakota .....	.47		55	53	50
South Dakota .....	.73	80	75	72	75
Nebraska .....	.68	69	72	70	69
Kansas .....	.59	60	61	58	59
Kentucky .....	.83	83	82	81	82
Tennessee .....	.82	84	82	82	82
Alabama .....	.91	88	92	88	90
Mississippi .....	.93	91	92	90	91
Louisiana .....	.88	88	90	88	88
Texas .....	.75	76	70	71	73
Oklahoma .....	.48	49	51	48	49
Arkansas .....	.88	89	87	88	88
Montana		57	53	56	56
Wyoming		65	80	60	65
Colorado .....	.68	67	67	69	67
New Mexico		54	71	55	55
Arizona			82	75	78
Utah .....	.83	85	90	84	84

EXHIBIT "A"—(Continued)

States and Territories	Field	State	County	Township	Board Members' Estimate
Idaho	88	90	91	88	89
Washington	76	69	77	74	75
Oregon	79	81	85	80	80
California		85	87	84	80

EXHIBIT B.—Condition of Corn.

[Sample Sheet]

(Board Members' Estimates)

States and Territories	Member A	Member B	Member C	Member D	Final
Maine	94	94	93	94	94
New Hampshire ...	89	90	90	89	90
Vermont	85	85	85	85	85
Massachusetts	88	89	88	89	88
Rhode Island	97	96	97	95	97
Connecticut	90	91	92	90	91
New York	82	82	82	82	82
New Jersey	78	79	78	78	78
Pennsylvania	78	79	79	78	78
Delaware	83	85	84	83	83
Maryland	75	75	76	75	75
Virginia	81	82	82	81	82
West Virginia	65	68	67	67	66
North Carolina	83	83	83	83	83
South Carolina	85	85	85	86	85
Georgia	84	85	84	85	84
Florida	84	85	84	85	84
Ohio	77	77	77	77	77
Indiana	86	86	86	86	86
Illinois	86	86	87	86	86
Michigan	77	76	76	77	76
Wisconsin	76	75	75	76	75
Minnesota	80	80	79	79	79
Iowa	82	82	82	82	82
Missouri	84	84	83	84	84
North Dakota	50	53	50	51	51
South Dakota	75	73	74	76	75
Nebraska	69	70	70	69	69
Kansas	59	60	60	59	60
Kentucky	82	82	82	83	82

EXHIBIT "B"—(Continued)

States and Territories	Member A	Member B	Member C	Member D	Final
Tennessee	82	82	82	83	82
Alabama	90	89	91	90	90
Mississippi	91	91	92	92	91
Louisiana	88	88	88	88	88
Texas	73	72	73	74	73
Oklahoma	49	49	49	50	49
Arkansas	88	88	88	88	88
Montana	56	55	56	56	56
Wyoming	65	68	67	65	65
Colorado	67	68	68	67	68
New Mexico	55	60	58	57	56
Arizona	78	79	80	77	79
Utah	84	85	86	86	85
Idaho	89	90	90	89	89
Washington	75	73	74	75	75
Oregon	80	82	81	80	80
California	85	85	85	85	85

EXHIBIT C.

